

ORIGINAL

PATENT APPLICATION

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IN THE
UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): Barry BRONSON

Confirmation No.: 5716

Application No.: 09/809,213

Examiner: N. Patel

Filing Date: 03/16/2001

Group Art Unit: 2673

Title: METHOD AND APPARATUS FOR DISPLAYING IMAGES

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TRANSMITTAL OF APPEAL BRIEF

Sir:

Transmitted herewith in triplicate is the Appeal Brief in this application with respect to the Notice of Appeal filed on 03/15/2004.

The fee for filing this Appeal Brief is (37 CFR 1.17(c)) \$330.00.

(complete (a) or (b) as applicable)

The proceedings herein are for a patent application and the provisions of 37 CFR 1.136(a) apply.

() (a) Applicant petitions for an extension of time under 37 CFR 1.136 (fees: 37 CFR 1.17(a)-(d) for the total number of months checked below:

() one month	\$110.00
() two months	\$420.00
() three months	\$950.00
() four months	\$1480.00

() The extension fee has already been filled in this application.

(X) (b) Applicant believes that no extension of time is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition and fee for extension of time.

Please charge to Deposit Account 08-2025 the sum of \$330.00. At any time during the pendency of this application, please charge any fees required or credit any over payment to Deposit Account 08-2025 pursuant to 37 CFR 1.25. Additionally please charge any fees to Deposit Account 08-2025 under 37 CFR 1.16 through 1.21 inclusive, and any other sections in Title 37 of the Code of Federal Regulations that may regulate fees. A duplicate copy of this sheet is enclosed.

(X) I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, Alexandria, VA 22313-1450. Date of Deposit: 05/12/2004

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Respectfully submitted,

Barry BRONSON

By 

Jonathan M. Harris

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appellant:	Barry BRONSON	§	Confirmation No.:	5716
Serial No.:	09/809,213	§	Group Art Unit:	2673
Filed:	03/16/2001	§	Examiner:	N. Patel
For:	Method And Apparatus For Displaying Images	§	Docket No.:	10006185.1

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APPEAL BRIEF

Technology Center 2600

Mail Stop Appeal Brief – Patents

Date: May 12, 2004

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Sir:

Appellant hereby submits this Appeal Brief in connection with the above-identified application. A Notice of Appeal was filed on March 15, 2004.

I. REAL PARTY IN INTEREST

The real party in interest is the Hewlett-Packard Company, an assignment to the Hewlett-Packard Company was recorded on 06/07/2001, Reel/Frame 011873/0713.

II. RELATED APPEALS AND INTERFERENCES

Appellant is unaware of any related appeals or interferences.

III. STATUS OF THE CLAIMS

Originally filed claims: 1-20.

Claim cancellations: None.

Added claims: 21-28.

Presently pending claims: 1-28.

Presently appealed claims: 1-28.

IV. STATUS OF THE AMENDMENTS

Appellants did not file any amendments after the final rejection.

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V. SUMMARY

As the name implies, a head-mounted display system is worn on a person's head as shown in Figure 1 of Appellant's disclosure. Head-mounted display systems include individual displays for each eye. Page 1, lines 9-12. In at least some head-mounted display systems, the left eye and right displays are provided with the same image. Thus, the person's left eye sees the same image as the right eye. Page 2, lines 4-6. "Because each of the user's eyes are presented identical images, both the right and the left image displays 16, 18 must be of relatively high resolution..." Page 2, lines 13-14. This may be undesirable because the cost of an image display generally increases with increasing resolution. Page 2, lines 18-19.

Appellant's contribution is an image display device 40 as exemplified in Figure 4. "The image display device 40 includes a right display 42 and a left display 44, the right display 42 for displaying an image to a right eye 45 of a user, and the left display 44 for displaying an image to the user's left eye 47." Figure 4 and page 5, lines 18-21. The image display device 40 is capable of displaying an image with a high perceived resolution by providing two different images to each of the left and right eye displays. The user's brain employs "binocular summation" to combine the two different images into a perceived single image that appears sharper than the individual images. Page 7, lines 2-8. "In general terms, the two differing images are produced when the processor 54 transmits a display signal to the right display 42 that is generated from only a portion of the data sampled from the source image signal, and, when the processor 54 transmits a display signal to the left display 44 that is generated from another portion of the data sampled from the source image signal." Page 7, lines 10-14. "In the above embodiment, because the images displayed by the right and left displays 42, 44 differ, more information is conveyed to the user's brain than would be conveyed if identical images were presented to each of the user's eyes 45, 47." Page 7, lines 18-20.

VI. ISSUE

Whether claims 1-28 are anticipated under 35 U.S.C. § 102(e) by Morishima (U.S. Pat. No. 5,589,956).

VII. GROUPING OF CLAIMS

Appellant proposes the following claim groupings. The claims in each grouping stand separately from the claims in the other groupings based on the arguments provided in section VIII. The claim numbers in parentheses are the claims that Appellant specifically addresses as representative of each grouping in the arguments below.

- Group 1: claims 1,2, and 4-9 (1)
- Group 2: claim 3 (3)
- Group 3: claims 10-15 (10)
- Group 4: claims 16-20 (16)
- Group 5: claims 21 and 23 (21)
- Group 6: claim 22 (22)
- Group 7: claim 24 (24)
- Group 8: claim 25 (25)
- Group 9: claim 26 (26)
- Group 10: claim 27 (27)
- Group 11: claim 28 (28)

VIII. ARGUMENT

A. The Morishima Reference

Morishima is directed to an image display apparatus in which, as illustrated in Figures 3 and 4, an image 11 is divided into separate portions 14-1, 14-2, and 14-3 and provided to a plurality of LCDs 1-1, 1-2, and 1-3. The images from the plurality of LCDs are provided to a single eye of a person. That is, the three LCDs 1-1, 1-2, and 1-3 provide an image to just one of the person's eyes. The apparatus depicted in many of the Figures of Morishima illustrate the apparatus

used to provide an image to a single eye. The Morishima patent prefaces the discussion of the apparatus as follows:

FIG. 3 illustrates a state wherein only the left eye portion of an observer 6 is observed from a position above the head of the observer 6, and does not illustrate the right eye portion. However, the apparatus is symmetrical about the center of the face of the observer 6.

Column 4, lines 11-16. This passage thus states that the apparatus being shown and described in the description is replicated for the right eye. As such, Morishima teaches dividing an image into a plurality of portions that are provided to the same eye. The other eye is presented with the same or similar compilation of images. This conclusion is further supported by the fact that the various embodiments depicted in the Morishima patent depict an image being provided to a single pupil referred to by reference numeral 7 in some figures and 81 in other figures, not different images provided to two pupils. See Morishima's Figures 5, 7, 10, 12, 13, 15, 17, 18, and 25.

In the various Office Actions, the Examiner made reference to Figure 28B in Morishima. Figure 28B shows two eyes of a person receiving visual input. As explained in the associated text of Morishima, the images provided to a person's eyes have an associated parallax angle. Column 17, lines 18-42. Morishima does not teach or suggest providing different images to each of a person's eyes.

B. Claim 1 (group 1)

Independent claim 1 requires, among other limitations, dividing image signal data into first and second portions, generating right and left display signals using the first and second portions, transmitting the right and left display signals to right and left displays, and displaying right and left images on the right and left displays. Claim 1 also requires the first and second portions to comprise first and second reduced data sets defining the entire image. As explained above, Morishima teaches dividing an input image into separate portions and providing the separate portions to displays associated with one eye. Morishima does not teach or even suggest dividing an input image into separate portions and providing the separate portions to different eyes. Morishima also does not teach

or suggest generating right and left display signals using first and second portions of an image that comprise reduced data sets defining the image. At least for these reasons, the Examiner erred in rejecting claim 1 and its dependent claims over Morishima.

Appellant previously made the above arguments to the Examiner. In the final Office Action, the Examiner responded that Morishima's Figures 4, 11, and 19 allegedly show separate images to the person's eyes. Figures 4 and 11 do show separate images 14-1, 14-2, and 14-3 on three separate displays 1-1, 1-2, and 1-3, respectively. However, the images from the three displays are provided to the same eye of the person. That is, each eye sees a collection of three displays as exemplified in Figure 3. Figure 19 shows two separate displays 73 and 74, but as shown in Figure 17, displays 73 and 74 are viewed by a single eye of a user. This conclusion is apparent at least based on reference numeral 81 in Figure 17 that is described as being a single pupil of an observer. See col. 14, lines 14-15. Nowhere does Morishima even suggest that each eye sees a different image. In fact, Morishima teaches the opposite in that only the apparatus for a single eye is shown in the depicted embodiments but that "the apparatus is symmetrical about the center of the face of the observer 6." Col. 4, lines 14-15. Thus, evidently, the same apparatus is replicated for the other of the user's eyes.

C. Claim 3 (group 2)

Claim 3 depend from claim 1. The Examiner erred in rejecting claim 3 at least for the same reasons as claim 1 as explained above. In addition, claim 3 requires "selecting a left set of image data values...of which none are included in the right set of image data values." Morishima does not teach or even suggest providing different images to the person's eyes, much less selecting left eye image data values of which none are included in the right eye image data values. For this additional reason, the Examiner erred in rejecting claim 3.

D. Claim 10 (group 3)

Independent claim 10 comprises displaying a right image on a right display using a first portion of a source image signal, the first portion comprising a first

reduced data set defining the entire image and displaying a left image on a left display using a second portion of the source image signal, the second portion of the source image signal differing from the first portion of the source image signal, the second portion comprising a second reduced data set defining the entire image. As explained above, Morishima does not teach or suggest displaying separate images to both eyes using different portions of a source image signal. Morishima also does not teach or suggest displaying separate images to both eyes using portions of a source image signal where the portions comprise reduced data sets defining the entire image. At least for these reasons, claim 10 is neither anticipated by, nor rendered obvious over, Morishima and accordingly, the Examiner erred in rejecting claim 10. Claims 11-15 depend on or from claim 10 and the Examiner erred in rejecting these claims at least for the same reason as claim 10.

E. Claim 16 (group 4)

Claim 16 is directed to an image display device that comprises, among other limitations, a controller arranged to utilize first and second portions of image signal data to generate right and left display signals where the first and second portions comprise first and second reduced data sets. Claim 16 also requires right and left displays that receive the right and left display signals, respectively. Morishima does not teach or even suggest this combination of limitations. Accordingly, claim 16 is neither anticipated by, nor rendered obvious over, Morishima. The Examiner thus erred in rejecting claim 16. Claims 17-20 depend on or from claim 16 and the Examiner erred in rejecting these claims at least for the same reasons as claim 16.

F. Claim 21 (group 5)

Method claim 21 requires generating first and second sets of pixels from an input image using different portions of the input image and providing the first and second sets of pixels to a left eye display and right eye display, respectively. Morishima neither teaches nor suggests such a combination of limitations. At least for this reason, the Examiner erred in rejecting claim 21 and its dependent claims.

G. Claim 22 (group 6)

Dependent claim 22 depends from claim 21 and thus is allowable for at least the same reason. Further, dependent claim 22 specifies that generating the first and second sets of pixels comprises selecting different rows and columns of the input image when generating the first set of pixels than when generating the second set of pixels. Morishima does not teach or even suggest providing different images to each eye much less selecting different rows and columns of an input image when generating the first and second sets of pixels for the left and right eye displays, respectively. At least for this additional reason, the Examiner erred in rejecting claim 22

H. Claim 24 (group 7)

Dependent claim 24 depends from claim 21 and further specifies averaging pixels in adjacent rows. This feature is not taught or suggested by Morishima. At least for this additional reason, the Examiner erred in rejecting claim 24

I. Claim 25 (group 8)

Claim 25 is an apparatus claim that comprises, among other limitations, a controller coupled to the left and right eye displays, wherein the controller receives an input image and, from the input image, generates a left eye image to be shown on the left eye display and a right eye image to be shown on the right eye display. Further, the claimed controller generates the left and right eye images using portions of the input image, wherein the portion use to generate the left eye image differs from the portion used to generate the right eye image. The Examiner erred in rejecting claim 25, and its dependent claims, in that Morishima does not teach or suggest generating left and right eye images using different portions of an input image.

J. Claim 26 (group 9)

Claim 26 depends form claim 25 and thus the Examiner erred in rejecting claim 25 at least for the same reason as claim 25. Further, claim 26 requires the controller to select different columns of the input image when generating the left eye and right images. Morishima does not teach or suggest selecting different

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columns of an input image to generate different left and right eye images. For this additional reason, the Examiner erred in rejecting claim 26.

K. Claim 27 (group 10)

Dependent claim 27 depends on claim 26 and further specifies that the controller averages pixels in adjacent rows. This feature is not taught or suggested by Morishima. At least for this additional reason, the Examiner erred in rejecting claim 27.

L. Claim 28 (group 11)

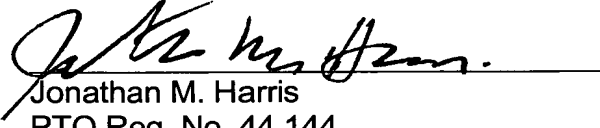
Dependent claim 28 depends on claim 25 and further specifies that the controller selects different rows and columns when generating the left and right eye images. Morishima does not teach or even suggest providing different images to each eye much less selecting different rows and columns of an input image when generating the left and right eye images. At least for this additional reason, the Examiner erred in rejecting claim 28

IX. CONCLUSION

For the reasons stated above, Appellant respectfully submits that the Examiner erred in rejecting all pending claims. If any fees or time extensions are inadvertently omitted or if any fees have been overpaid, please appropriately charge or credit those fees to Hewlett-Packard Company Deposit Account Number 08-2025 and enter any time extension(s) necessary to prevent this case from being abandoned.

Respectfully submitted,

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APPENDIX TO APPEAL BRIEF

CURRENT CLAIMS

1. (Previously presented) A method of displaying images using an image display device having two displays, each display being arranged in the image display device so as to be capable of presenting an image to an eye of a user, the method comprising:

dividing image signal data into a first portion, the first portion comprising a first reduced data set defining the entire image, and a second portion, the second portion comprising a second reduced data set defining the entire image, the first portion differing from the second portion;

generating a right display signal using the first portion of the image signal data;

generating a left display signal using the second portion of the image signal data;

transmitting the right display signal to a right one of the displays;

transmitting the left display signal to a left one of the displays;

displaying a right image on the right display from the right display signal; and

displaying a left image on the left display from the left display signal, substantially simultaneously with the displaying of the right image.

2. (Original) The method of claim 1, wherein the image signal data includes data capable of describing a source image arrangeable into an array of columns and rows, the step of dividing image signal data comprising:

selecting a right set of image data values from the image signal data corresponding to selected points on the array of the source image, the right set of image data values being used to form the first portion of the image signal data; and

selecting a left set of image data values from the image signal data corresponding to selected points on the array of the source image,

the left set of image data values differing from the right set of image data values, and being used to form the second portion of the image signal data.

3. (Original) The method of claim 2, wherein the step of selecting a left set of image data values includes the step of selecting image data values of which none are included in the right set of image data values.
4. (Original) The method of claim 2, wherein the step of the step of dividing image signal data comprises:
transmitting the right and left sets of image data values to an address calculator.
5. (Original) The method of claim 2, wherein the step of generating a right display signal comprises:
formatting the right set of image data values.
6. (Original) The method of claim 5, wherein the step of generating a left display signal comprises:
formatting the left set of image data values.
7. (Original) The method of claim 1, wherein the step of displaying a right image on the right display comprises the step of displaying a right image of $n \times m$ resolution, and the step of displaying a left image on the left display comprises the step of displaying a left image of $n \times m$ resolution, wherein n and m are integers.
8. (Original) The method of claim 1, comprising;
sampling a source image signal to produce the image signal data.

9. (Original) The method of claim 8, wherein the step of sampling a source image signal comprises:

sampling a frame of the source image signal to produce the image signal data.

10. (Previously presented) A method of displaying images using an image display device having two displays, each display being arranged in the image display device so as to be capable of presenting an image to an eye of a user, the method comprising:

displaying a right image on a right display using a first portion of a source image signal, the first portion comprising a first reduced data set defining the entire image; and

displaying a left image on a left display using a second portion of the source image signal, the second portion of the source image signal differing from the first portion of the source image signal, the second portion comprising a second reduced data set defining the entire image.

11. (Original) The method of claim 10, wherein the step of displaying the left image includes displaying the left image substantially simultaneously with the displaying of the right image.

12. (Original) The method of claim 10, comprising:

dividing the source image signal into the first portion of the source image signal and the second portion of the source image signal.

13. (Original) The method of claim 12, wherein the source image describes a frame of a source image, the dividing step comprising:

selecting image data values describing a first portion of the frame to generate a right set of image data values; and

selecting image data values describing a second portion of the frame to generate a left set of image data values.

14. (Original) The method of claim 13, comprising:
sampling the source image signal.
15. (Original) The method of claim 10, wherein the step of displaying a right image comprises the step of displaying a right image of $n \times m$ resolution, and the step of displaying a left image comprises the step of displaying a left image of $n \times m$ resolution, wherein n and m are integers.
16. (Previously presented) An image display device, the device comprising:
a controller arranged to utilize a first portion of image signal data to generate a right display signal, and to utilize a second portion of image signal data to generate a left display signal, the first portion of the image signal data and the second portion of the image signal data being obtained from a source image signal, the first portion comprising a first reduced data set defining the entire image, and the second portion comprising a second reduced data set defining the entire image;
a right display operably connected to the controller to receive the right display signal and to utilize the right display signal to display a right image to a right eye of a user; and
a left display operably connected to the controller to receive the left display signal and to utilize the left display signal to display a left image to a left eye of a user, wherein the right display signal differs from the left display signal.
17. (Original) The image display device of claim 16, further comprising:
an image source for generating the source image signal.

18. (Original) The image display device of claim 16, wherein the controller comprises:

a sampler, the sampler being disposed to receive the source image signal from the image source and to generate image signal data therefrom.

19. (Original) The image display device of claim 16, wherein the image source includes a digital storage medium.

20. (Original) The image display device of claim 16, further comprising:

a right lens disposed to modify the image displayed by the right image display; and

a left lens disposed to modify the image displayed by the left image display device.

21. (Previously presented) A method, comprising:

generating first and second sets of pixels from an input image using different portions of the input image; and

providing the first and second sets of pixels to a left eye display and right eye display, respectively.

22. (Previously presented) The method of claim 21 wherein the input image comprises an array of pixels having rows and columns, and wherein generating the first and second sets of pixels comprises selecting different rows and columns of the input image when generating the first set of pixels than when generating the second set of pixels.

23. (Previously presented) The method of claim 21 wherein the input image comprises an array of pixels having rows and columns, and wherein generating the first and second sets of pixels comprises selecting different columns from the

input image when generating the first set of pixels than when generating the second set of pixels.

24. (Previously presented) The method of claim 23 wherein generating the first and second sets of pixels also comprises averaging pixels in adjacent rows.

25. (Previously presented) An image display device, comprising:
a left eye display;
a right eye display; and
a controller coupled to the left and right eye displays, wherein the controller receives an input image and, from the input image, generates a left eye image to be shown on the left eye display and a right eye image to be shown on the right eye display;
wherein the controller generates the left and right eye images using portions of the input image, wherein the portion use to generate the left eye image differs from the portion used to generate the right eye image.

26. (Previously presented) The image display device of claim 25 wherein the input image comprises an array of pixels having rows and columns, and wherein the controller selects different columns of the input image when generating the left eye image than when generating the right eye image.

27. (Previously presented) The image display device of claim 26 wherein the controller also averages pixels in adjacent rows when generating the left and right eye images.

28. (Previously presented) The image display device of claim 25 wherein the input image comprises an array of pixels having rows and columns, and wherein the controller selects different rows and columns of the input image when generating the left eye image than when generating the right eye image.